Neoplastic Transformation in Differentiated Epithelial Cell Systems In Vitro

Edited by L. M. Franks and C. B. Wigley
Academic Press; London, New York, 1979
xii + 314 pages. $33.50

The use of in vitro model systems to study biological phenomena represents a major advance: such phenomena can now be studied at the cellular level under controlled conditions and with fewer variables (such as immunological reactions and hormonal influences). With in vitro model systems for chemical carcinogenesis there is the additional advantage of a relatively high yield of transformed cells by contrast with the low yield in vivo. Accordingly, most of the new insights into the mechanisms of action and the molecular biology of spontaneous and virus-induced transformation have been derived from the application of in vitro techniques. Therefore, various cell culture assays for the study of chemical carcinogenesis have also been developed and are being used today routinely, at least in part. Since all these assays, however, employ fibroblastic cells and since, on the other hand, the great majority of human tumors develop from cells of epithelial origin, there is today a great need for the development of transformation assays with epithelial cells.

This monograph offers the first review of technical problems associated with the culture of epithelial cells and of epithelial transformation systems now in use. In addition to extensive literature reviews the various chapters contain a great deal of original previously unpublished information and ideas on future developments in this area. In particular, the investigation of cellular differentiation processes during transformation, which seems feasible in such epithelial cell systems, opens new and intriguing research possibilities. Individual chapters are concerned with discussions of markers for transformation (I. B. Weinstein et al., J. K. Cowell, C. M. Franks), carcinogen metabolism in vitro (J. E. Gielen et al.), and reviews of transformation systems with epithelial cells from the salivary gland (C. B. Wigley), skin (N. Fusenig et al., K. Indo and H. Miyaji, and N. Colburn), bladder (I. C. Summerhayes), respiratory tract (L. M. Franks and C. B. Wigley), liver (T. Kuroki et al.) and brain (O. D. Laerum et al.). Each chapter is accompanied by extensive literature citations.

This monograph represents the proceedings of a workshop held at the Imperial Cancer Research Fund in London in June 1978, and necessarily, in a rapidly developing area such as this, more important information has been accumulated in the meantime (such as the study of markers for the neoplastic transformation of liver cells by G. M. Williams and his coworkers in Cancer Research 39 (1979) 1029 and 4441). Nevertheless, however, this stimulating monograph provides extensive reviews and new information and will, undoubtedly, make fascinating reading to cell and molecular biologists in general and cancer researchers in particular.

N. W. J. Marquardt

Molecular Basis of Environmental Toxicity

Edited by R. S. Bhatnagar
Ann Arbor Science; Michigan, 1980
x + 590 pages. £22.00

The chapters in this book are largely based on the papers presented at a Symposium on the Molecular Basis of Environmental Toxicity held as part of the 176th National Meeting of the American Chemical

Society. Such volumes often consist merely of manuscripts reporting data that will be, or already have been, published in conventional journals. In my view, they are of use only if there is extensive reporting of the discussion that took place, perhaps the most useful feature of any symposium, and/or the authors of the papers place their own work in context and take a broad view of the field.

The present volume fails on the first criterion. No attempt whatsoever is made to report discussions. On the second criterion, it scores rather better. I particularly enjoyed the chapters by Pryor (methods of detection of free radicals), Foote (photo-oxidation reactions), Aust et al. (lipid peroxidation), Mustafa et al. (pulmonary response to ozone and nitrogen dioxide), Moore et al. (chemical carcinogenesis as related to physiological state of the cell), Petering (molecular basis of mental toxicity), Bhatnagar et al. (collagen), and Witschi and Haschek (correlation of molecular mechanism and cell damage).

Overall, then, a book well worth reading but not as good as it could have been.

B. Halliwell

Biochemistry and Structure of Cell Organelles

by R. R. Reid and R. M. Leech
The Blackie Publishing Group; Glasgow, London, 1980
176 pages. £5.75 (paperback); £11.50 (hardcover)

This little book attempts to present an up-to-date account of the biochemistry of the various subcellular organelles, suitable for use by honours degree students. It begins with a chapter on 'compartmentation'. This is followed by chapters on the various organelles (nucleus, chloroplasts and other plastids, mitochondria, microbodies, endoplasmic reticulum, Golgi apparatus and lysosomes), a chapter on metabolic integration and finally an account of the role of chromaffin granules, synaptic vesicles and sarcoplasmic reticulum in neuromuscular activity.

As one would expect from the expertise of Professor Leech, I found the chapter on plastids to be an excellent summary of our current knowledge of these organelles. Only two points of criticism arise: firstly, there is little discussion of regulation of the Calvin cycle enzymes, which has been a major research area recently; and secondly, it seems to be implied that the nitrate reductase enzyme is physically associated with chloroplasts whereas rigorous subcellular fractionation experiments have shown it to be present only in the cytosol of leaf tissues.

I also enjoyed the chapters on the cell nucleus and lysosomes, as well as those on compartmentation and integration. By contrast, I was disappointed with the rather 'standard' account given of mitochondria, principally because so little was said about mitochondria in plant tissues. The chapter on endoplasmic reticulum and Golgi apparatus was adequate, but did not discuss the problem of contamination of such isolated fractions with plasma membrane vesicles, which has caused great difficulty in studies of enzyme localisation in plant and animal tissues.

The worst chapter was that on microbodies. None of the recent advances in our knowledge of the role of animal peroxisomes in lipid metabolism (e.g., as a site of β-oxidation of fatty acids) is presented, and even leaf peroxisomes are treated very skimpily.

Overall then, I would recommend my students to read this book if they see it in the library but not to go out of their way to get a copy. In the introduction, the authors said that they could have written a whole book on each organelle. It might have been a better use of their time and expertise to have written such a book on chloroplasts and/or mitochondria alone.

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